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TITLE PAGE

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Public-private sector interactions and the demand for supplementary health insurance in the United Kingdom

ABSTRACT

We examine the demand for private health insurance (PHI) in the United Kingdom and relate this to changes in the supply of public and private healthcare. Using a novel collection of administrative, private sector and survey data, we re-assess the relationships between the quality and availability of public and private sector inpatient care, and the demand for PHI. We find that PHI coverage in the United Kingdom is positively related to the median of the region- and year-specific public sector waiting times. We find that PHI prevalence *ceteris paribus* increases with being self-employed and employed, while it decreases with having financial difficulties. In addition, we highlight the complexities of inter-sectoral relations and their impact on PHI demand. Within a region, we find that an increase in private healthcare supply is associated with a decrease in public sector waiting times, implying lower PHI demand. This may be explained by the usage of private facilities by NHS commissioners. These results have important implications for policymakers interested in the role of private healthcare supply in enhancing the availability of and equitable access to acute inpatient care.

1. INTRODUCTION

This paper examines the determinants of demand for private health insurance (PHI) in the United Kingdom - a context in which the National Health Service (NHS) provides a comprehensive statutory package of services free-at-the-point-of-use, and in which supplementary coverage is held by approximately 15% of the population aged over 20. This coverage offers insurance against the costs of privately-delivered services that are also provided within the NHS (for which PHI subscribers must continue to pay through their taxes and to which they retain full access). The key attractions of holding such coverage are therefore the access to faster treatment and wider choice of specialists, facilities and timing of treatment that it may provide (Rodríguez and Stoyanova, 2004). However, premiums for

individual purchasers tend to be expensive, and only a minority of employers offer coverage to their staff (Foubister et al., 2006). Accordingly, baseline models view the perceived quality of public sector provision, together with income, as the main determinants of the demand for PHI (e.g. Besley et al., 1999; Costa and García, 2003).

To date, conflicting results have been observed with respect to the association between PHI demand and the quality of NHS services, as measured by waiting times.¹ Besley et al. (1999) find that regions of England characterised by longer waiting lists have higher PHI coverage on average. King and Mossialos (2005) also find significant associations between waiting times and PHI coverage. In contrast, Propper et al. (2001) find that, in England, waiting lists do not play a role in explaining PHI coverage. Instead, the number of private hospitals and senior doctors are important, along with age. The authors suggest that as the stock of medical labour is fixed in the short run higher private sector capacity reduces the supply of senior doctors available to the NHS, giving rise to a perception among patients that the quality and capacity of the private sector has increased relative to those of the NHS. Overall, the evidence suggests that perceived differences in quality and capacity between the public and private sectors have a major influence on PHI demand.

However, the latter study draws attention to the complex nature of public-private sector interaction in terms of the effect on demand for PHI. In this respect, it is significant that the extent of such interaction has increased since these earlier studies were conducted. This is especially the case in England where market-oriented structural reforms aimed at providing patients with more choice have been an important part of the policy framework. Since 2002, many NHS patients (in England and to a lesser extent in Scotland and Wales)

¹ As clinical outcomes data are rudimentary in the NHS, consumer perceptions of quality are likely to focus on intermediate aspects, especially waiting times.

have been treated at private hospitals for diagnostic and elective services. From January 2006, General Practitioners were required to offer patients a choice of four or five hospitals (Naylor and Gregory, 2009). In addition, reforms introduced between 2003 and 2008 formalised and greatly increased the ability of private hospitals to compete with NHS hospitals for patients, for instance through the so-called Independent Sector Treatment Centre programme, which delivered a wide range of routine elective care for NHS-funded patients (Kelly and Stoye, 2015). In consequence, spending on private facilities by NHS commissioners in England (mostly Primary Care Trusts and, from 2011, some Clinical Commissioning Groups) more than quadrupled in real terms between 2002 and 2012, to £1.2 billion (Competition & Markets Authority, 2014). By the end of that period funding from NHS commissioners constituted 28% of inpatient income for private hospitals (Laing & Buisson, 2013).

In this context, the relationships between the supply of private healthcare and the demand for PHI has become more complex than was the case when the aforementioned studies were undertaken. For instance, higher private sector capacity might increase the demand for PHI if inpatient care providers are able to “induce” demand for their services and consumers seek financial protection against the associated costs (Labelle et al., 1994). In this case, the positive effect of higher private sector supply on PHI demand may offset the negative effect of lower NHS waiting times on PHI demand. Conversely, if private hospital capacity is made available to NHS patients, and this leads to a reduction in NHS waiting times, this may contribute to a reduction in PHI demand.

Our aim, therefore, is to examine the PHI demand and the relationships with the quality and availability of public and private sector inpatient care. To address this aim, we use a novel combination of survey data from 2000-2011 matched with administrative and

private sector data. In addition, we use new waiting time measure. According to Foubister et al. (2006), PHI packages typically cover surgery as an inpatient or day case, hospital accommodation and nursing care, and inpatient tests. We therefore use a measure of NHS waiting time that is likely to be most relevant to the choice between publicly and privately financed healthcare – the median inpatient waiting time.

The remainder of this paper is structured as follows. In section 2, we outline our data sources and descriptive statistics. In section 3, we present our empirical results. In section 4, we relate our findings to previous theoretical and empirical literature and end with an outline of policy implications.

2. DATA AND PRELIMINARY ANALYSIS

We make use of data from two surveys covering the period 2000-2011: the British Household Panel Survey (BHPS) and the English Longitudinal Study of Ageing (ELSA). Both the BHPS and ELSA data were accessed through the UK Data Archive (UKDA). The BHPS ran annually between 1990 and 2008 but the questions regarding PHI coverage were only asked from wave 6 (1996). After 2008 the *Understanding Society* survey replaced the BHPS, but does not provide information on PHI coverage. In our analysis of the BHPS we excluded respondents aged below 20 years and those living in Northern Ireland. We focus on the years 2000-2008 as some of the regional level indicators are not available for earlier years. ELSA is a bi-annual survey covering people aged 50 and above, restricted to England only. The first wave of the survey was conducted in 2002/2003, and we use data up to years 2010/2011 (wave 5). Using two different surveys (BHPS and ELSA) allows us to check the robustness of the results with respect to the source of individual data, finding that the

results are qualitatively robust. In addition, the ELSA data make it possible to extend the analysis period up to 2011.

We focus on a single indicator of PHI coverage: whether the respondent is covered by any type of PHI, regardless of whether this coverage is provided by an employer or through the purchase of another family member. The prevalence of PHI coverage among the population aged over 20 was 15.4% in 2008, the final year of the BHPS. Of this, around one third paid all or a part of the premium directly; one third received the insurance via their employer; and the final third were insured through the purchase of another family member.

Table 1 shows the time pattern of PHI coverage rates in the UK. The coverage rates fell at the end of the 1990s, when tax relief on PHI premiums was discontinued, and again in 2007, which we assume is due to the financial crisis which began in that year. The degree of stability in the PHI rates is notable, given that this was a period in which NHS funding increased at its fastest ever rate, at an average of 6.6% per year between 2000 and 2008 (Appleby et al., 2008), which might have been expected to exert greater influence on PHI coverage rates. This may imply that the high transaction costs associated with buying and selling PHI, alongside a certain degree of consumer inertia, were features of this market in this period. In addition, , as we discuss below, factors such as lower waiting times and the higher supply of private care may have offsetting effects.

According to the BHPS data, PHI coverage is most prevalent among people aged 30-60, and the coverage rate peaks around age 40. The difference between the BHPS and ELSA statistics, which can also be seen in Table 1, are explained by the different age coverage. Coverage rates are higher in England than in Scotland and Wales, and there is considerable

regional variation in PHI prevalence also within England. The highest prevalence is observed in London, the East of England and the South East.

[insert Table 1 here]

We merge both data sets with region-level indicators of public and private healthcare supply: specifically, real public sector health expenditures per capita, available public hospital beds per capita, and private hospital beds per capita. Further indicators (as specification checks) are introduced in section 3.3. The regions are the former Government Office Regions of England, while Scotland and Wales are considered as individual regions (as listed in Table 1). We use various public data sources to construct the indicators of public inpatient healthcare availability. We do not use indicators of the availability of outpatient care. Since PHI typically covers inpatient care only, it is unlikely that outpatient care availability would exert a strong influence on PHI demand. Detailed descriptions of the data sources and the construction of the variables are provided in *Appendix A*. Region-specific statistics at the beginning and end of the study period are provided in *Appendix B*.

The inpatient waiting times data are based on the Hospital Episode Statistics as provided by the Health & Social Care Information Centre (HSCIC), the Information Services Division (ISD) Scotland, and the Patient Episode Database for Wales (PEDW). Unlike Besley et al. (1999), Propper et al. (2001), and Jofre-Bonet (2000) (using Spanish data), in which the length of waiting lists are used as a proxy for waiting times, we collected data on median waiting times. This indicator captures more effectively the time that patients can expect to wait for inpatient treatment, which is more likely to influence PHI demand than the length of waiting lists itself (as also pointed out by Johar et al. (2013)).

In the first part of the period the median inpatient waiting times increased (by up to approximately seven weeks in England) but then fell from 2005 onwards (down to around five weeks in England). Differences in statistical methodologies across regions and over time imply measurement errors, decreasing the statistical significance of the empirical results. The BHPS results are robust to restricting the estimation sample to England only, thus avoiding the measurement differences with Scotland and Wales.

The private healthcare data are from Laing and Buisson's *Healthcare Market Review*, volumes 1999/2000 through to 2009/2010. Laing and Buisson is an independent specialist consultancy in health and community care, and has reviewed the UK private healthcare market since 1988. The time pattern of private and public inpatient beds per capita is starkly different in two ways. First, the average number of available private beds is an order of magnitude smaller than of the public beds (three NHS hospital beds and 0.35 private inpatient beds per 1000 inhabitants in England in 2010/2011). Second, the trend of available private beds is increasing, while the number of public beds has diminished. This contrast is particularly notable in Wales, which has seen both the strongest increase in private beds and the strongest decrease in public beds.

3. EMPIRICAL RESULTS

In section 3.1, we analyse how PHI is related to the quality and availability of public healthcare services and the availability of private healthcare services. In section 3.2, we document the interrelations between the supply of private inpatient care services, and the quality and availability of public inpatient care services. In section 3.3, we extend the analysis of PHI coverage with indicators of NHS spending on private care and private care quality. We summarise the results in section 3.4.

3.1 Identifying the determinants of PHI coverage

First, we estimate probit models of PHI coverage to reveal the correlations with health care indicators. The estimated model is:

$$\Pr(PHI_{irt} = 1) = \Phi(\beta_0 + \beta_1 X_{irt} + \beta_2 Z_{rt}). \quad (1)$$

Subscript i refers to individual, r to region, and t to time. The model is estimated separately on the BHPS and the ELSA data. All survey years are pooled together, but in this baseline specification we do not include time effects and individual or region fixed effects. The time coverage of the regressions runs from 2000/2001 to 2008/2009 in case of the BHPS data and from 2002/2003 to 2010/2011 in the case of the ELSA data. Z is the vector of public and private healthcare indicators, vector X includes gender, age, age squared, marital status, having children, education level, health, financial circumstances, employment, smoking habits, and political preferences. While specification (1) suffers from omitted-variables bias due to unobserved regional and individual characteristics, this model allows us to reliably estimate coefficients for regressors with limited time variation.

Next, we extend the model with year effects and individual fixed effects (FE) and estimate a linear probability FE model. We apply this linear specification to avoid the problem of incidental parameters inherent in probit FE models:

$$PHI_{irt} = \gamma_0 + \gamma_1 \tilde{X}_{irt} + \gamma_2 Z_{rt} + \theta_i + \pi_t + u_{irt}. \quad (2)$$

In the above, \tilde{X} is the same as X in equation (1), but excludes age and individual characteristics with little or no time variation (gender, having children, education level). The individual fixed effects (θ) capture unobserved, time-invariant, individual-specific PHI demand characteristics. Region dummies are not included due to the negligible within-

individual variation. The time effects (π) capture aggregate economic or political changes that can influence PHI demand.

In columns (1) and (2) of Table 2 we present the estimates based on the BHPS data, and in columns (3) and (4) we present the results based on the ELSA data. Subjective health is excluded from the set of regressors when using the ELSA data, because it is unavailable for wave 3. Also, we do not include indicators of political preferences because of the lack of variables comparable to the BHPS indicators.

[insert Table 2 about here]

Estimating equation (1) shows a positive correlation of PHI coverage with NHS waiting times, and a negative correlation with public healthcare expenditures. These relations are statistically significant and of the expected sign, as higher quality and availability of public healthcare decreases the demand for care that is not funded by the NHS, and hence also for PHI. The positive relation to waiting times is stronger in the ELSA data, which is based on later years and an older population. In addition, PHI coverage is more likely to be purchased if there is a greater supply of private care in the region. The relation to the relative number of public hospital beds is insignificant.

Further analysis of the results of columns (1) and (3) reveals that PHI coverage is more prevalent among the self-employed or employed. Having financial difficulties implies seven percentage points lower likelihood of PHI coverage, and reporting good or excellent health implies two percentage points higher likelihood of coverage. The results are robust to the choice between the datasets used.

Apart from waiting times, the healthcare indicators do not have a statistically significant relation to PHI coverage once time and individual effects are accounted for. This change in the coefficients suggests that there are important time-constant, region- and individual-specific differences in healthcare provision and PHI coverage rates. The low within-individual *R*-squared values also indicate limited temporal variation in the variables.

The estimated coefficient of private inpatient care supply has an unexpected negative sign when equation (2) is estimated using the BHPS data, implying that an increase in private supply within a region is on average negatively related to PHI coverage.

One possible explanation is that the increasing degree of competition among private providers (that is implied by greater capacity) drives down the costs of service provision, thereby lowering the demand for PHI. However, in the context of a recent inquiry by the UK Competition and Markets Authority (2014), which found high barriers to entry and expansion for private hospitals and weak competition among private hospitals in many markets, this explanation is unpersuasive. A more likely explanation is that a higher number of private beds enables greater usage of private hospitals by the NHS in order to reduce waiting times, thereby reducing PHI demand. This explanation is further supported by the results on private beds and waiting times reported in section 3.2 below.

The results also indicate that, over the analysed years, there was very little variation in PHI coverage within each region, and hence little change to be explained by region-specific variation in the indicators of public and private care. The significant relations between PHI coverage and public and private healthcare indicators stem from aggregate, not region-specific, changes in supply and from time-invariant differences in PHI demand and the supply of healthcare across regions.

The results of equation (2) also indicate that the demand for PHI increases if someone becomes employed or self-employed, but decreases with entering into financial difficulties or reporting improving health.

Estimating the models of PHI coverage reveals policy-relevant relations between the public and private healthcare sectors. The possibility of reverse causality is reduced by relatively low PHI coverage rates and the small scale of the private healthcare sector in the UK. Inevitably, therefore, the influence of PHI coverage on the healthcare supply statistics is weak. In addition, the results are robust to using the lagged values of the healthcare indicators. Nevertheless, if PHI coverage increases the demand for private healthcare and decreases the demand for public healthcare, this implies a certain degree of upward bias in the coefficient of private hospital beds, and downward bias in the coefficients of public expenditures, public hospital beds and waiting times in the models of PHI coverage.

3.2 Availability of private inpatient care and the availability and quality of NHS inpatient care

Our unique dataset on the supply of private hospital beds makes it possible to analyse how the availability of private inpatient care is related to the availability and quality of public sector care, and thereby examine further the ambiguous relations between private hospital bed supply and PHI coverage outlined in section 3.1. We document pairwise relations between the indicator of private inpatient care availability and indicators of public health care. We do not estimate causal effects.

We run the following region-level panel regressions with region fixed effects, covering years 2000/2001 to 2008/2009 (corresponding to the time coverage of the BHPS data used):

$$private\ beds_{rt} = \alpha_0 + \alpha_1 public\ care\ quality_{rt} + \Psi_r + \varepsilon_{rt}, \quad (3)$$

where index r indicates region and index t time. We run three separate regressions: first, waiting times; second, public hospital beds; third, public health expenditures included as regressor. This is essentially a correlation analysis among the variables cleaned from the region-specific, time-invariant characteristics. The estimated α_1 coefficients are presented in Table 3. Including both time and region fixed effects simultaneously leads to insignificant results, which implies that part of the estimated effects are due to aggregate rather than region-specific shocks.

[insert Table 3 about here]

The results indicate that on average within a region, one week shorter inpatient waiting times are associated with 14 more private hospital beds per 1 million population. This suggests that over time within a region shorter waiting times are achieved partly by a higher supply of private care beds (e.g. in the East of England and East Midlands regions).

The numbers of public and private hospital beds are negatively related within a region, over time, again suggesting substitutions between public and private care availability. The correlations with public health expenditures only correspond to the observation that during the analysed period on average within a region both the public expenditures and the number of private beds increased, partly due to the increased use of private sector facilities by the NHS.

3.3 Extensions with further indicators of private care

In section 3.1. above, we showed that across regions, the number of private inpatient beds is positively related to PHI demand. To analyse how the use of private beds by the NHS and the quality of private inpatient care influence this relationship, we re-estimate equation (1) with additional indicators. As we have observations for a few waves only, we cannot reliably re-estimate equation (2), and do not include these indicators as part of the main specifications. For the purpose of simplifying the discussion, we estimate these models on the BHPS data, only. The detailed results are reported in *Appendix C*.

First, we extend the model with an indicator of NHS spending on private healthcare: the proportion of commissioners' secondary care budgets spent on services from private hospitals. The source for these data is the Nuffield Trust, as detailed in *Appendix A*. These data are available for England only, in the years from 2006. This indicator is negatively correlated with public hospital beds and waiting times, and positively correlated with private hospital beds. However, using this indicator, we do not find evidence that the extended use of private sector providers by the NHS reduces the demand for PHI. The marginal effect of the indicator of NHS expenditure on private sector care is positive but insignificant. The positive estimated effect of waiting times increases, but becomes insignificant with the limited time coverage.

Next, as a proxy for the quality of private inpatient care, we use the regional level median prices of two treatment types: hip replacement (median price: £11,054) and cataract surgery (median price: £2,420). These indicators are based on the prices quoted in "privatehealth.co.uk" website (*Appendix A* provides further details). The rationale for using price as a proxy for quality is based on Bagwell and Riordan (1991) and Wolinsky (1983),

who show that high prices are an efficient means of signalling quality where information is asymmetric between producers and consumers (which is likely to be the case for inpatient care). As historical data are unavailable, we have to make the assumption that regional differences in private care quality are permanent.

Re-estimating equation (1) on the cross-section of year 2008 and adding in the price indicators increases the positive estimated effect of waiting times by one order of magnitude. The estimated effect of hip replacement price is significantly positive, while the effect of cataract surgery price is negative but insignificant. The estimated effect of private bed availability on PHI demand becomes insignificant, which is due to the strong positive correlation (0.83) between the indicators of private bed availability and the median cost of hip replacement. Overall, given data limitations and the possible endogeneity of prices, these results provide weak evidence that the demand for PHI increases with the regional level quality of private inpatient care.

3.4 Summary of results

In relation to the first part of the analysis (section 3.1), we conclude that longer waiting times are associated with higher PHI prevalence. Specifically, an increase in median inpatient waiting times of 10 weeks is associated with a 2-8 percentage points higher rate of PHI coverage. This positive relationship can be seen if we analyse PHI coverage differences both within regions through time and across regions. In terms of the latter, there is a positive association between higher PHI coverage and the supply of private healthcare. Increasing the number of private inpatient beds by one per 1000 inhabitants is associated with approximately 23-29 percentage points higher PHI prevalence. Across regions, we find

positive relationships between private sector capacity, PHI coverage and waiting times. The availability of NHS hospital beds has a weaker relation to PHI coverage probability.

Table 4 provides a brief summary of how these results relate to the earlier evidence in the literature.

[insert Table 4 about here]

There are some persistent differences across regions. These differences partly stem from region-specific preferences for private healthcare. For example, the East of England and London are among the regions with the highest PHI coverage rates. At the same time, these areas are characterised by long waiting times (East of England) and/or high numbers of private inpatient beds (London). These differences persist across the 11-year study period, such that when region effects (via individual fixed effects) are included, there are insignificant relations between PHI coverage and the indicators of healthcare supply.

Changes in the healthcare indicators are often due to aggregate shocks such as country-level changes in NHS expenditures and policies. If the level of PHI demand reacts to aggregate changes, e.g. to a decrease in waiting times throughout England, Scotland and Wales, then time effects capture these reactions and again lead to insignificant results.

In relation to the second part of the analysis (section 3.2), the results indicate that higher private healthcare supply within a region is associated with lower waiting times. Specifically, on average within a region, one week shorter inpatient waiting times are associated with 14 more private hospital beds per 1 million inhabitants. This may suggest that over time within a region shorter waiting times are partly achieved by the higher supply of private healthcare which in turn reduces PHI demand. This is in line with Arora et al.

(2013), who provide indicative evidence for substitutions between publicly and privately funded inpatient care.

Extending the analysis with additional indicators of private care availability and quality in section 3.3 indicates that across regions, the positive relation between waiting times and PHI demand is a qualitatively robust result, and private care quality might induce PHI demand, though the evidence is weak.

4. DISCUSSION AND CONCLUSION

This paper examines interactions between the public and private sectors in healthcare provision and the demand for PHI in the United Kingdom. Using commercial, administrative and survey data, we find that PHI coverage is positively related to NHS waiting times, employment, and financial status. The results on waiting times correspond to the predictions of the models presented by Besley et al. (1999) and Costa and García (2003) among others. They are consistent with the findings of previous empirical studies (Besley et al. 1999; King and Mossialos, 2005), but contrary to those of Propper et al. (2001). The results are based on region and time specific median inpatient waiting times, which capture more effectively the time that patients can expect to wait for hospital admission than mean waiting times, or the length of the waiting lists.

The period we examine is one in which the role of the private sector in the delivery of publicly funded health services has increased against a backdrop of rising real expenditures, decreasing numbers of NHS inpatient beds, increasing numbers of private sector inpatient beds, and falling NHS waiting times. Our findings highlight the complexity of intersectoral interactions in this context. Within a region over time an increase in private inpatient healthcare supply is associated with a decrease in waiting times and PHI

prevalence. This may be explained by the purchase of private care by NHS commissioners, reducing waiting times and the propensity of consumers to buy PHI. This suggests that greater use of private sector by the NHS can help to cut waiting times and reduce PHI demand. This interpretation is supported by Kelly and Stoye (2015), who show that the introduction of privately owned hospitals in geographic areas increased overall demand for elective hip replacements but also reduced waiting times for these services in those areas.

However, it is worth noting that large-scale use of private sector capacity in recent years has been enabled by historic increases in public expenditure on healthcare which are unlikely to re-occur in the coming years (NHS England, 2013). Our results have implications for policymakers that operate in a context of tight budgetary control. The current NHS England planning framework, for example, assumes that NHS expenditure will grow at approximately the rate of inflation between 2010/11 and 2020/21, with the result that expenditure as a proportion of GDP will decrease from 7.7% to 6% (NHS England, 2013). These projections are likely to imply stricter control, and perhaps more rationing, of publicly funded health services. In this respect, the positive relationship between the availability of private inpatient healthcare, waiting times and PHI coverage *across regions* is likely to be of interest to policy-makers. The results imply that higher waiting times result in higher demand for private inpatient care, and financial protection against the associated costs.

In this context, our results suggest that the demand for PHI may increase in the coming years as publicly financed care (undertaken in both the public and the private sector) is constrained. In addition, we have shown that the prevalence of PHI coverage increases with being self-employed and employed and with deteriorating health, and decreases with having financial difficulties. It is possible that a change in the propensity to use privately-financed healthcare, especially among the relatively affluent, may in the

coming years erode support for the NHS and/or enhance the political acceptability of alternatives which, in turn, may lead to greater inequity in coverage and access to healthcare.

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TABLES AND FIGURES

Table 1: Private health insurance coverage by year and by region

	BHPS data
1996	17.8%
1997	16.9%
1998	17.5%
1999	15.1%
2000	15.4%
2001	15.5%
2002	16.6%
2003	16.6%
2004	16.1%
2005	16.2%
2006	16.5%
2007	15.8%
2008	15.4%

	BHPS, average over 1996-2008	ELSA, average over 2002-2011
North East	12.04%	6.21%
North West	16.33%	12.79%
Yorkshire & Humber	18.34%	11.41%
East Midlands	14.52%	13.38%
West Midlands	16.72%	11.90%
East of England	22.31%	17.67%
London	24.95%	21.95%
South East	23.49%	20.32%
South West	16.42%	14.51%
Wales	12.60%	
Scotland	10.52%	

Table 2: Average marginal effects on PHI coverage probability (columns 1 and 3) and FE estimates (columns 2 and 4)

	BHPS data		ELSA data	
	(1)	(2)	(3)	(4)
median waiting times (week)	0.00337** [0.00138]	0.00239* [0.00145]	0.00762*** [0.00171]	0.00746*** [0.00272]
public hospital beds (per 1000 population)	0.00215 [0.00454]	-0.0146 [0.00989]	-0.00525 [0.00449]	-0.0163 [0.0120]
private hospital beds (per 1000 population)	0.233*** [0.0218]	-0.0229 [0.0369]	0.290*** [0.0274]	0.0133 [0.0426]
public HC expenditures (per capita, 1000 GBP, 2005 prices)	-0.0379*** [0.00728]	0.00818 [0.0314]	-0.0399*** [0.0129]	0.0116 [0.0433]
financial difficulties	-0.0713*** [0.00449]	-0.00745*** [0.00239]	-0.0691*** [0.00700]	-0.00148 [0.00620]
employed or self-employed	0.0688*** [0.00668]	0.0333*** [0.00447]	0.0116* [0.00692]	0.0540*** [0.00701]
retired	-0.00428 [0.0101]	-0.0132** [0.00526]	0.00762*** [0.00171]	-0.00388 [0.00446]
good health	0.0187*** [0.00441]	-0.00397* [0.00235]		
wave dummies	no	yes	no	yes
individual fixed effects	no	yes	no	yes
individual control variables	yes	yes	yes	yes
Observations	95,199	95,744	50,724	50,941
Pseudo R-squared	0.1071		0.0852	
Within individual R-squared		0.0047		0.0142
Between individual R-squared		0.0201		0.0106

Robust standard errors in brackets (Probit: clustered at individual level), *** p<0.01, ** p<0.05, * p<0.1

Individual controls include age squared, marital status, smoking and political preferences (BHPS only). Additional controls in specifications (1) and (3): gender, age, secondary and higher education dummy, having children.

Table 3: Estimated coefficients of the indicators of public care, dependent variable: number of private hospital beds per million population (data coverage: England, Scotland, Wales, 2000/2001 to 2008/2009)

Regressor		
Median inpatient waiting times (week)	Public hospital beds per 1,000 population	Per capita public health expenditures, 1,000 GBP, 2005 prices
-14.390***	-78.237***	96.847***
[4.236]	[13.594]	[15.658]

Robust standard errors in brackets, ***p<0.01, ** p<0.05, * p<0.1. Region fixed effects included. Each column corresponds to a separate regression.

Table 4: Overview of the earlier and current results

	Besley et al. (1999)	Propper et al. (2001)	King & Mossialos (2005)	Our results
Time coverage	1986-1991	1978-1996	1997-2000	2000-2011
Method	Probit with time and region effects	Linear FE models with time and region effects	Random effects logit	Probit and linear FE models with and without time and individual effects
Main results on PHI coverage	Long term (>12 months) waiting lists have significant positive effect	Insignificant waiting lists, negative effect of NHS expenditures, positive effect of private care availability	Significant positive effects of inpatient and outpatient waiting times and of the supply of private surgeons	Negative relation to NHS expenditures and public beds, positive relation to private beds and waiting times. Apart from the relation to waiting times, the relations become insignificant if individual and time effects are included.